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PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference A3-0266 PK/rs	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/SG2003/000093	International Filing Date (day/month/year) 23 April 2003	Priority Date (day/month/year) 23 April 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ C23C 18/31, 18/48		
Applicant INSTITUTE OF MATERIALS RESEARCH AND ENGINEERING et al		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 3 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p style="padding-left: 40px;">These annexes consist of a total of 3 sheet(s).</p>
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 22 July 2003	Date of completion of the report 21 May 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer E.J. MARTYN Telephone No. (02) 6283 2332

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description, pages 1 - 10, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages 11 - 13, received on 20 April 2004 with the letter of 20 April 2004
- ☒ the drawings, pages 1 - 7, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1 - 32	YES
	Claims	NO
Inventive step (IS)	Claims 1 - 32	YES
	Claims	NO
Industrial applicability (IA)	Claims 1 - 32	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

Claims 1 - 32

The invention of the amended claims is a method for the electroless deposition of a desired metal layer on one or more selected portions of a substrate surface, wherein the substrate has a film of indium tin oxide formed thereon and wherein the method includes the steps of applying a masking layer onto the surface; exposing the one or more selected portions of the surface to a colloidal suspension of catalytic particles; and exposing the one or more selected portions of the surface to an ionic solution containing ions of the desired metal.

No individual citation or obvious combination of citations disclose the selective formation of a metal layer on the surface of a substrate which has a film of indium tin oxide formed thereon.

The closest art are:

JP 60241291 A

WO 1996032521 A.

Claims

The claims defining this invention are as follows:

1. A method for the electroless deposition of a desired metal layer on one or more selected portions of a substrate surface, wherein the substrate has a film of indium tin oxide (ITO) formed thereon and wherein the method includes the steps of:
 - applying a masking layer onto the surface, said masking layer adapted to have one or more apertures formed therein so as to expose the one or more selected portions of the surface;
 - exposing the one or more selected portions of the surface to a colloidal suspension of catalytic particles adapted to adsorb to the substrate surface and to enhance deposition of the desired metal layer thereon; and
 - exposing the one or more selected portions of the surface to an ionic solution containing ions of the desired metal to enable formation of the metal layer on said one or more selected portions.
2. A method according to claim 1, wherein the one or more apertures are formed in the masking layer after applying the layer to the substrate surface.
3. A method according to claim 2 wherein at least some of the one or more apertures of the masking layer lie over one or more portions of the ITO film.
4. A method according to any one of claims 1 to 3, wherein the colloidal suspension includes particles of catalytic metal.
5. A method according to claim 4, wherein, when the substrate surface includes a film of ITO formed thereon, the catalytic metal and the material of the substrate are selected so that no substantial adsorption of the catalytic metal occurs on the substrate material.
6. A method according to claim 4 or claim 5, wherein the catalytic metal is palladium.
7. A method according to any one of claims 4 to 6, wherein the catalytic metal particles are polymer-stabilised.

8. A method according to claim 7, wherein the catalytic metal particles are stabilised with polyvinyl alcohol, poly(vinylpyrrolidone) or a combination of these.
- 5 9. A method according to any one of claims 4 to 6, wherein the catalytic metal particles are stabilised with a solution containing tin ions.
10. A method according to any one of claims 5 to 9, wherein the substrate material is glass.
- 10 11. A method according to any one of claims 1 to 10, wherein the masking layer is formed of a polymeric material to which no substantial adherence of the catalytic particles occurs.
12. A method according to claim 11, wherein the polymeric material is selected from the group consisting of suitable polycarbonates, fluorinated polymers, cellophane, polyimide and acrylate-based polymers.
- 15 13. A method according to claim 11 or claim 12, wherein the polymeric material is a photoresist.
14. A method according to any one of claims 1 to 13, wherein the masking layer is formed of a dry film resist.
- 20 15. A method according to claim 14, wherein the dry film resist is selected from the group consisting of Asahi Chemical's SunfortTM resists and DuPont's RistonTM resists.
16. A method according to any one of claims 11 to 15, wherein the one or more apertures in the masking layer are formed using UV lithography, a laser or screening means.
- 25 17. A method according to any one of claims 1 to 16 wherein, prior to the step of exposing the selected portions of the substrate to the colloidal solution, the layered substrate is cleaned to remove any residues of polymeric or organic material.
- 30 18. A method according to claim 17, wherein the cleaning is effected by plasma cleaning or UV ozone cleaning techniques.
19. A method according to any one of claims 1 to 18, wherein the step of exposing the one or more selected portions of the substrate to the colloidal solution is effected by dipping the substrate containing the masking layer into a bath of the colloidal solution.

20. A method according to any one of claims 1 to 19, wherein, after the step of exposing the one or more selected portions of the substrate to the colloidal solution, the selected portions are rinsed with de-ionised water.
- 5 21. A method according to claim 20 wherein, after the rinsing step, the selected portions are dried to remove substantially all of the water from the selected portions.
22. A method according to claim 21, wherein the drying step includes placing the layered substrate in an oven.
- 10 23. A method according to claim 21, wherein the drying step includes blowing a stream of gas over the layered substrate.
24. A method according to any one of claims 1 to 23, wherein the drying step includes both placing the layered substrate in an oven and blowing it with a stream of gas.
- 15 25. A method according to claim 23, wherein the step of exposing the one or more selected portions to the ionic solution is effected by dipping the substrate containing the masking layer into a bath of the ionic solution.
26. A method according to any one of claims 1 to 25 wherein, after formation of the metal layer, the masking layer is removed.
- 20 27. A method according to claim 26 wherein a strongly basic solution is used to facilitate removal of the masking layer.
28. A method according to any one of claims 1 to 24, wherein the masking layer is removed prior to the step of exposing the one or more selected portions to the ionic solution.
- 25 29. A method according to any one of claims 1 to 28, wherein the desired metal is selected from the group consisting of copper, nickel, chromium, molybdenum, tantalum and any alloy of these metals.
30. A method according to claim 29, wherein the desired metal is selected from copper and nickel.
- 30 31. A method for the electroless deposition of a desired metal layer on one or more selected portions of a substrate surface, substantially as herein before described with reference to any one or more of the drawings.
32. A product made according to the method of any one or more of claims 1 to 31.